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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/046,979	01/17/2002	Yoshiaki Toyota	ASA-1050	5404

7590

04/21/2003

MATTINGLY, STANGER & MALUR, P.C.
Suite 370
1800 Diagonal Road
Alexandria, VA 22314

EXAMINER

DUONG, THOI V

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 04/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicant No.

10/046,979

Applicant(s)

TOYOTA ET AL.

Examiner

Thoi V Duong

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figures 2-4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4 and 10-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhang (USPN 5,814,529).

As shown in Figs. 1A-1E, Zhang discloses a manufacturing method of an image display, comprising the steps of:

forming a plurality of island-shaped semiconductor layers onto a substrate 101 ;
forming a first insulation film 104 onto said island-shaped semiconductor layers;
forming a gate electrode 106 and a storage electrode 107 onto said first insulation film;
forming a source region, a drain region 103, and a channel region sandwiched between them onto said island-shaped semiconductor layers;
forming a second insulation film 108 onto said storage electrode;

forming interlayer insulation films 109 onto regions above said gate electrode and said storage electrode;

simultaneously removing said interlayer insulation film of a contact hole portion and said interlayer insulation film above said storage electrode (items 110, 111 and 112 in Fig. 2A); and

simultaneously forming a source electrode 116 and a drain electrode 117 which are connected to said source region and said drain region, and an electrode which is extended from the wiring 117 on said second insulation film (col. 4, lines 5-12),

wherein said second insulation film is formed to an upper portion and a side portion of said gate electrode simultaneously with said step of forming the second insulation film onto said storage electrode;

wherein said second insulation film is an insulation film made of silicon oxide, an organic material (col. 3, lines 29-33); and

wherein said island-shaped semiconductor layer is an island-shaped polysilicon layer (col. 3, lines 12-28).

Zhang also discloses that by setting a suitable etching condition, a silicon nitride film can be used for the second insulating film as an etching stopper (col. 3, lines 34-40). Accordingly, the relative permittivity of said second insulation film is higher than that of said first insulation film which is made of silicon oxide (col. 3, lines 15-18).

Finally, in Fig. 2A, Zhang discloses an oxide layer formed on a storage electrode 207 (col. 4, lines 26-35).

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4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang (USPN 5,814,529) in view of Jung et al. (USPN 6,317,173 B1).

Zhang discloses a liquid crystal display (LCD) device that is basically the same as that recited in claims 5 and 7 except for a parallel capacitor. As shown in Figs. 19 and 20, Jung discloses a liquid crystal display comprising a parallel capacitor including:

a first capacitor constructed by a polycrystalline silicon layer 200, a first insulation film 300, and a storage electrode 420; and a second capacitor constructed by said storage electrode, a second insulation film 500 and an innerlayer insulation film 700 which is formed on said storage electrode, and a pixel electrode 800 (col. 3, lines 48-59), wherein the first insulating layer may be made of SiO₂ and the second insulating layer may be made of SiN_x (col. 6, lines 35-39 and 57-59) for obtaining a sufficient storage capacitance for the display (col. 24, lines 30-34). As known in the art, the relative permittivity of SiN_x (=7) is higher than that of SiO₂ (=4). Accordingly, the first insulation film and the second insulation film can be made of a same high dielectric constant material (SiN_x).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the LCD device of Zhang with the teaching of Jung by forming an additional capacitor constructed by a polycrystalline silicon layer, a

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first insulation film, and a storage electrode so as to obtain a sufficient storage capacitance for the display.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang (USPN 5,814,529) in view of Tanabe et al. (USPN 5998838).

Zhang discloses a liquid crystal display (LCD) device that is basically the same as that recited in claim 6 except that the first insulation film is not a laminate film of a silicon oxide film and a high dielectric constant film. As shown in Fig. 1(b), Tanabe discloses a thin film transistor comprising a gate insulating layer which is a laminate film of a first layer 5 formed of silicon dioxide and a second layer 6 formed of silicon nitride which is higher permittivity than silicon dioxide so as to improve the electrical properties of the interface between the semiconductor layer and the adjacent gate insulating layer as well as to gain a desired MOS capacitance without thinning the gate insulating layer down to a minimum (col. 9, lines 1-9). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the LCD device of Zhang with the teaching of Tanabe by forming the first insulation film as a laminate film of a silicon oxide film and a high dielectric constant film so as to improve the electrical properties of the interface between the semiconductor layer and the adjacent gate insulating layer and to reduce the threshold value in operating the thin film transistor.

7. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang (USPN 5,814,529) in view of Hara et al. (USPN 6,046,790).

Zhang discloses a liquid crystal display (LCD) device that is basically the same as that recited in claims 8 and 9 except for a frame memory. As shown in Figs. 10-12,

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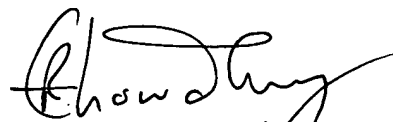
Hara discloses a LCD device comprising a frame memory 35 provided in a pixel and constructed by a capacitor 3 and a switch 5 formed on a substrate in order to temporarily store image data (col. 30, lines 5-9) so as to obtain a fast response speed for the display (col. 31, lines 1-13). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the LCD device of Zhang with the teaching of Hara by forming a frame memory constructed by a capacitor and a switch so as to obtain a fast response speed for the display.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (703) 308-3171. The examiner can normally be reached on Monday-Friday from 8:00 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (703) 305-3492.

Thoi Duong

04/15/2003


T. Chowdhury
Primary Examiner